

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:

BORONAT *et al.*

Appl. No.: Not yet assigned

Filed: Herewith

For: **Nucleic Acid Sequences to Proteins  
Involved in Isoprenoid Synthesis**

Art Unit: Not yet assigned

Examiner: Not yet assigned

Atty. Docket: 16515.102

**PRELIMINARY AMENDMENT**

Commissioner for Patents  
Washington, D.C. 20231

Sir:

Prior to examination on the merits, please amend the above identified application, filed concurrently herewith, as follows:

**In the Specification:**

On page 1, please **delete** the first full paragraph and **replace** it with the following paragraph:

This application is a continuation application of U.S. Serial Number 09/549,787 filed April 14, 2000, which claims the benefit of the filing dates of provisional applications U.S. Serial Number 60/129,899, filed April 15, 1999, and U.S. Serial Number 60/146,461, filed July 30, 1999, all of which are herein incorporated by reference in their entireties.

On page 1, please **add** the following paragraph before the paragraph entitled "TECHNICAL FIELD":

**INCORPORATION OF SEQUENCE LISTING**

A paper copy of the Sequence Listing and a computer readable form of the sequence listing on diskette, containing the file named SeqList.txt, which is 10.3

09/549,787

kilobytes in size (measured in MS-DOS), and which was created on November 13, 2001, are herein incorporated by reference.

**In the Claims:**

Please **cancel** original claims 1-20.

Please **add** new claims 21-38.

21. An isolated nucleic acid molecule comprising a nucleic acid sequence encoding 1-deoxy-D-xylulose 5-phosphate reductoisomerase, wherein said 1-deoxy-D-xylulose 5-phosphate reductoisomerase is found in *Arabidopsis*.

22. An isolated polynucleotide selected from the group consisting of:

(a) an isolated polynucleotide comprising a nucleotide sequence encoding the polypeptide of SEQ ID NO: 2;

(b) an isolated polynucleotide comprising SEQ ID NO: 1;

(c) an isolated polynucleotide comprising a nucleotide sequence which has at least 70% identity to that of SEQ ID NO: 1 over the entire length of SEQ ID NO: 1;

(d) an isolated polynucleotide comprising a nucleotide sequence which has at least 80% identity to that of SEQ ID NO: 1 over the entire length of SEQ ID NO: 1;

(e) an isolated polynucleotide comprising a nucleotide sequence which has at least 90% identity to that of SEQ ID NO: 1 over the entire length of SEQ ID NO: 1;

(f) an isolated polynucleotide comprising a nucleotide sequence which has at least 95% identity to that of SEQ ID NO: 1 over the entire length of SEQ ID NO: 1;

(g) an isolated polynucleotide that hybridizes, under stringent conditions to SEQ ID NO: 1 over the entire length of SEQ ID NO: 1; and

(h) an isolated polynucleotide complementary to the polynucleotide sequence of (a), (b), (c), (d), (e), (f), or (g).

23. A DNA construct comprising, as operably associated components in the 5' to 3' direction of transcription: a promoter functional in a plant cell, a polynucleotide according to Claim 22, and a transcriptional termination sequence.

106677 " 52028660

24. A host cell comprising the construct of Claim 23.
25. The host cell according to Claim 24, wherein the host cell is a plant cell.
26. A plant comprising a cell according to Claim 25.
27. A method for the alteration of the isoprenoid content in a plant, comprising:
- (a) transforming said plant with a construct comprising as operably linked components, a transcriptional initiation region functional in a plant, a polynucleotide according to Claim 22, and a transcriptional termination region; and
  - (b) growing said plant, wherein said plant has said alteration of isoprenoid content.
28. The method of Claim 27, wherein said polynucleotide is in the sense orientation.
29. The method of Claim 28, wherein the isoprenoid content is increased.
30. The method of Claim 27, wherein said polynucleotide is in the antisense orientation.
31. The method of Claim 30, wherein the isoprenoid content is decreased.
32. A method for producing an isoprenoid compound of interest in a plant cell, said method comprising:
- (a) obtaining a transformed plant, said transformed plant having and expressing in its genome: a primary construct comprising a DNA sequence encoding a polynucleotide comprising a transcriptional initiation region functional in a plant cell operably linked to a polynucleotide according to Claim 22; and at least one secondary construct comprising a DNA sequence encoding an isoprenoid enzyme operably linked to a transcriptional initiation region functional in a plant cell and
  - (b) growing said plant, wherein said plant produces said isoprenoid compound of interest.

09987055-1101

33. The method of Claim 32, wherein said isoprenoid compound is selected from the group consisting of tocopherols, carotenoids, monoterpenes, diterpenes, and plastoquinones.

34. A method for increasing the non-mevalonate isoprenoid biosynthetic flux in a cell from a plant, said method comprising:

(a) transforming said plant with a construct comprising as operably linked components, a transcriptional initiation region functional in a plant, a polynucleotide according to Claim 22, and a transcriptional termination region and

(b) growing said plant, wherein said plant has an increased non-mevalonate isoprenoid biosynthetic flux.

35. A method for modulating disease resistance in a plant, comprising:

(a) introducing into said plant, a construct comprising a polynucleotide according to Claim 22; and

(b) growing said plant, wherein said plant exhibits said modulated disease resistance.

36. An isolated polynucleotide according to Claim 22, wherein said polynucleotide comprises the nucleotide sequence of SEQ ID NO: 1.

37. An isolated polynucleotide according to Claim 22, wherein said polynucleotide comprises a nucleotide sequence encoding the polypeptide of SEQ ID NO: 2.

38. An isolated polynucleotide according to Claim 22, wherein said polynucleotide comprises a nucleotide sequence which has at least 95% identity to that of SEQ ID NO: 1 or its complement, over the entire length of SEQ ID NO: 1.

FILED 03/20/2000

**REMARKS**

By way of the present amendment, the specification has been amended to refer to the parent application and the sequence listing. Original claims 1-20 have been cancelled and new claims 21-38 have been added.

It is noted that Figure 1 of the present application (corresponding to SEQ ID NO: 2) differs from Figure 1 of the parent application by the insertion of a single amino acid at position 44 of the *Arabidopsis* sequence provided in the figure. The change in Figure 1 corrects an obvious typographical error in the first line of the *Arabidopsis* sequence included in Figure 1 of the parent application by inserting a Phe (F) in amino acid residue position 44. It is submitted that such change is fully supported by the parent application and merely corrects an obvious typographical error in the parent application which one of skill in the art would recognize the existence of, as well as recognize the appropriate correction for. *See* MPEP § 2163.07 (II).

In this regard, it is submitted that upon looking at Figure 1 of the parent application, one of ordinary skill would notice that the first line of the figure is out of alignment with the rest of the figure by one amino acid residue. Further, upon reading the specification, one of skill would note that the examples refer to a protein which has 477 amino acids, while original Figure 1 indicates a protein having only 476 amino acids. *See, e.g., Specification* at Examples 4 and 6. As such, one of skill would clearly recognize that there is an obvious typographical error in original Figure 1 between amino acid residues 41 and 49.

Once one of skill recognizes this obvious typographical error, it would be well within their ability to analyze the nucleotide sequence of SEQ ID NO: 1, which encodes the amino acid sequence of SEQ ID NO: 2, together with the information provided in the examples (*see, e.g., Example 4* of the specification) to determine the appropriate correction to the figure. Additionally, one of skill would be directed to the contents of the provisional applications of which the present application claims benefit and incorporates by reference. One of skill would clearly note that Figure 4 of priority application U.S. Serial Number 60/129,899 substantially corresponds to Figure 1 of the parent application except for the obvious deletion of Phe (F) from position 44 of the

*Arabidopsis* sequence. As such, it is respectfully submitted that the minor change to Figure 1 of the present application is fully supported in the parent application and entitled to the original filing date of the parent application, as well as the filing dates of the priority provisional applications.

### CONCLUSION

In view of the above, the presently pending claims are believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding objections and rejections of the claims, and to pass this application to issue. The Examiner is invited to contact the undersigned at (202) 942-5000 with respect to any unresolved issues remaining in this application.

Applicants authorize a charge to Deposit Account Number 50-1824 referencing Attorney Docket No 16515.102 for any fees (including fees for net addition of claims) related to the present application that are not otherwise provided for in the accompanying documents.

Respectfully submitted,



David R. Marsh (Reg. No. 41,408)  
June E. Cohan (Reg. No. 43,741)  
Milan M. Vinnola (Reg. No. 45,979)

Date: Nov 13, 2001

ARNOLD & PORTER, LLP  
555 12<sup>th</sup> Street, N.W.  
Washington, D.C. 20004  
(202) 942-5000 telephone  
(202) 942-5999 facsimile

**In the Specification:**

On page 1, please **delete** the first full paragraph and **replace** it with the following paragraph:

This application is a continuation application of U.S. Serial Number 09/549,787 filed April 14, 2000, which claims the benefit of the filing dates of provisional applications U.S. Serial Number 60/129,899, filed April 15, 1999, and U.S. Serial Number 60/146,461, filed July 30, 1999, all of which are herein incorporated by reference in their entirety.

On page 1, please **add** the following paragraph before the paragraph entitled “TECHNICAL FIELD”:

## INCORPORATION OF SEQUENCE LISTING

A paper copy of the Sequence Listing and a computer readable form of the sequence listing on diskette, containing the file named SeqList.txt, which is 10.3 kilobytes in size (measured in MS-DOS), and which was created on November 13, 2001, are herein incorporated by reference.

### In the Claims:

Please **cancel** original claims 1-20.

Please **add** new claims 21-38.